RFCA Stakeholder Focus Group February 20, 2002 Meeting Minutes

INTRODUCTION AND ADMINISTRATIVE

A participants list for the February 20, 2002 Rocky Flats Cleanup Agreement (RFCA) Stakeholder Focus Group meeting is included in this report as Appendix A.

Reed Hodgin of AlphaTRAC, Inc., meeting facilitator, reviewed the purpose of the RFCA Focus Group and the meeting rules. Introductions were made.

AGENDA

Reed reviewed the agenda:

- Agency Responses to the Wind Tunnel Studies Peer Reviews;
- Uranium Surface RSAL Calculation and Draft Modeling Results.

URANIUM SURFACE RSAL CALCULATION AND DRAFT MODELING RESULTS

The U.S. Environmental Protection Agency (EPA) provided a brief summary on the status of the Uranium surface Radiological Soil Action Level (RSAL) calculation and draft modeling results. EPA stated that preliminary calculations had been completed. These calculations showed that the toxicological risk, rather than the radiological risk, would dominate for Uranium and thus determine the value for the Uranium RSAL. This was due to the fact that the toxic effects from Uranium manifest at doses equal to or lower than the carcinogenic effect. There is still some controversy regarding background Uranium levels; e.g., whether Uranium in the soil is naturally occurring and whether it is contamination from Rocky Flats.

A Focus Group member cautioned that Uranium is more soluble in water compared to plutonium in water, and that water infiltration and transport of Uranium should be carefully evaluated.

Reed Hodgin, facilitator, asked a clarification question regarding the type of Uranium being modeled: "Was it natural, enriched, or depleted Uranium?"

4,5

ADMIN RECORD

RFCA Stakeholder Focus Group February 20, 2002 Meeting Minutes

Kaiser Hill, Ltd. said that both forms of Uranium were being modeled separately.

AGENCY RESPONSES TO THE WIND TUNNEL STUDIES PEER REVIEWS

Kaiser Hill, Ltd. presented Response to Peer Review Comments Wind Tunnel Analysis on behalf of the RSAL Working Group.

The Focus Group agreed to study the presentation and document and hold questions until the next Focus Group meeting.

Kaiser Hill reviewed the history of the wind tunnel studies. Two studies were conducted during 2000 by Midwest Research Institute and URS Corporation. The studies were originally designed to develop an annual mass loading multiplier for use in estimating RSALs. The studies quantified site-specific conditions pertaining to the soil-wind erosion potential following a fire on the Buffer Zone soils. Three peer-level scientists reviewed the two wind tunnel reports and commented on the methodology and approach to data interpretation used to determine the mass loading multiplier. The agencies addressed 56 relevant review comments, which were grouped by categories for this presentation, including questions posed by Focus Group members.

Comments were grouped into four categories:

- 1. Equipment adequacy;
- 2. Ability of wind tunnel to replicate representative meteorological conditions;
- 3. Sampling / data representativeness; and
- 4. Data interpretation.

Equipment Adequacy

The Focus Group asked the peer-level scientists to evaluate the ability of the equipment and staffing to perform erosion potential measurements. For this presentation, three major comments were included:

1. Recognized expertise and wind tunnel methodology – "equipment is in good standing with scientific community…"; "pitot tube is essential…";"…scientists and equipment have a long history of quality work…"

- 2. Noted limitations and their effect on the tunnel's ability to generate useable results—"...pitot tube is adequate since fast-response anemometry is not needed."
- 3. "...I think that no portable wind tunnel would exactly duplicate all possible fetch effects, but that some wind tunnel had to be used and that this wind tunnel is probably as good as most would be relative to the fetch effect."

Ability of wind tunnel to replicate representative meteorological conditions

Comments relating to meteorologically-induced effects had three general themes:

- 1. Wind tunnels do not simulate large scale turbulence and vertical wind components;
- 2. Small working section limits surface roughness variations and their effect; and
- 3. Saltation effect is limited in the wind tunnel.

1. Small-scale wind tunnels do not simulate large scale turbulence (wind speed variations), and vertical wind components

- "The test wind tunnels are probably too small in cross-section and too short in length to accurately simulate atmospheric boundary layer over a significant portion of the test section on the rough test surfaces at Rocky Flats."
- "The ratio of test section to length is greater than 100:1, which is a good indicator of boundary layer development. The main reason for assuring boundary layer development and stability is to characterize and control the shearing stress on the surface...The wind tunnel does that adequately."
- "Yet the erosion potentials so obtained have use in establishing RSALs, providing that we expect that the extreme erosion potentials observed are unlikely to ever exist in nature."
- "Turbulent variations on a small scale are abnormal in this wind tunnel...The result is that...flow variations are high-frequency, causing particles on the surface to oscillate, something that would not be as important in nature. ...In my opinion, the larger values of PM-10, TSP, and erosion potential reported may be construed as upper bounds, and thus provide a factor of conservatism to protect against unusual inhalation exposure."

- "In wind tunnels, the flux of momentum is carried by smaller-scale fluctuations than in outdoor work. However, one gets the same results by comparing resuspension for the same friction velocity in a wind tunnel or outdoors experimentation. That is, for the same friction velocity (momentum flux) you get the same resuspension, even though the turbulent spectrum is different for outdoor and wind-tunnel winds [This comment also goes to the representativeness of the data, discussed next.]
- The rapid fluctuations in wind speed are taken into account through the friction velocity in the wind tunnel.... I can accept this scale difference because I believe that it leads to an overestimate of suspended dust..."

- On vertical velocity:
 - "The average vertical velocity at the ground surface is zero, both in the wind tunnel and outside the tunnel."
 - Vertical wind variations are modeled well with the wind tunnel."

2. The layout and size of the small working section limits surface roughness variations and their effect

- "This wind tunnel adequately accounts for small-scale variations in surface cover and surface roughness. It does not account for large-scale or middle-scale variations, however."
- "In order to characterize differences in surface cover and surface roughness, the tunnel has to be moved several times... and the tests replicated. That gives satisfactory statistics between replicate results."

It was noted that, in the study, the wind tunnel was moved repeatedly on each plot. And plots were chosen to be representative of the burned area.

3. Saltation effect is limited to the wind tunnel

- "The implicit assumption in the wind tunnel test protocol was that... only wind would affect the test surface during a windstorm."
- "For the resuspension of PM-10, the dominant mechanism is the sand-blasting of the surface by particles larger than 100 micrometers."
- "In the wind tunnel, the onset of avalanching may be a product of the peculiar small scale of turbulence, and more soil might be available than under natural winds."
- "More recent observations show that there is an emission of small particles at speeds below the observed thresholds for saltation, and while this fact amounts to a relatively small emission loss, it affects the surface condition."

Sampling / data representativeness

Comments relating to data representativeness focused on three issues:

- 1. Ability of wind tunnel to obtain representative data,
- 2. Representativeness of particle resuspension mechanisms; and

3. Sampling artifacts.

1. Ability of wind tunnel to obtain representative data

"This reviewer will make an attempt to show that the observations made by the wind tunnel method provide a set of data that are sufficient to proceed with the determination of RSALs."

2. Representativeness of particle resuspension mechanisms

The reviewers commented regarding wind tunnel ability to erode particles, compared to nature:

- "The wind tunnel provides sufficient shearing stress at the surface to suspend particle aggregates in the size ranges far greater than the respirable-size particles... Redeposition is negligible."
- "It is the opinion of this reviewer that the results are likely to be an overestimate of suspended dust and erosion potential compared to the worst that would ever be observed in nature."
- "Roughness can act to dam or retard rather than release particles. This happens in nature too. Consequently, I think that this phenomenon is adequately modeled in a wind tunnel."

3. Sampling artifacts

One reviewer questioned calibration of the DustTRAK instrument, but concluded, "The main function of the DustTRAK was to provide real-time particle concentration data and this function was not seriously compromised by the data adjustments."

We (the agencies) agree and comment further: The DustTRAK calibration depends on the size distribution of the test aerosol; the instrument employs optical scattering. It was used for purposes of establishing depletion, and did not need absolute calibration.

"To increase the accuracy of tunnel estimates, it would have been useful to have a cyclone preseparator on the ambient PM-10 filter."

Broomfield City Hall February 20, 2002 3:30-5:30 p.m.

We agree (the agencies) with this comment. It is likely that the uncertainty in the multiplication factor introduced by the empirical correction is around 10%, based on the PM-10:TSP ratio observed near the wildfire site. The multiplication factor is conservative with the empirical correction used.

Data interpretation

A number of significant comments relate to interpretation of the results for RSAL purposes and were as follows:

- Soils at Rocky Flats are a "limited source" "The 'limited source' concept means that ...the present wind tunnel results would tend to overestimate the PM-10 available for resuspension."
- "The post-fire erosion potentials for the fall fire is estimated without a clear basis."
 Vegetative regrowth is predictable, and regrows with a similar pattern whether the regrowth starts in the spring or fall. As a first approximation, the shape of the 'recovery curve' would be expected to be similar in form.
- Regarding the shape of the 'recovery curve,' the resuspension factor used in risk assessments is recommended (NCRP 129, 1999) to decrease as t⁻¹, and this is in agreement with the wind tunnel observations at Rocky Flats.
- One reviewer inferred correctly that the fall fire consequences are truncated after the
 first year. While this is true, it is also true that fires in consecutive years on the same
 area are not excluded in the manner the data are used probabilistically, even though
 their consequences would be negligible. The second year of the fall fire recovery
 would have a multiplier that is smaller than for the spring fire.
- The "appropriateness" of the sampling periods relates to data interpretation. "The soil material measured at the tunnel exhaust is the integration of all the observed peaks and the data are summed"... to estimate the erosion potential.
- Regarding use of observed site-specific mass loading data... "I am in complete
 agreement with the choice take by the Task 3 RSALs Working Group authors to use
 the observed mass loading distributions."

SUMMARY RESPONSE

- The peer reviews provided very valuable insight into the viability of the wind tunnel for studies of this type.
- Comments reinforce the RSALs Working Group's use and interpretation of the data, without change.

- One highlight of the reviews is the sense that the resulting erosion potentials are likely to be overestimated. The effect this has on the mass-loading multiplication factor is likely to be less influential.
- One reviewer's comments caused us to determine that the PM-10 correction to the erosion potential calculation resulted in a higher-than-anticipated bias in the mass-loading multiplication factor. However, this finding does not suggest a bias so significant that the multiplication factor should be reduced.

ADJOURN

The meeting adjourned at 5:30 p.m.

RFCA Stakeholder Focus Group February 20, 2002 Meeting Minutes

Appendix A
Participants List

RFCA Stakeholder Focus Group Attachment A

Title:

February 20, 2002 Meeting Agenda

Date:

February 8, 2002

Authors:

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RFCA Stakeholder Focus Group Attachment B

Title:

February 6, 2002 Meeting Handouts:

- RSALs Task 3 and Windtunnel Review Comments
- Summary of End State Options Surface Contamination
- RFETS End State Options, Holistic Summary
- Papers from LeRoy Moore, Rocky Mountain Peace & Justice Center: "Excess Cancers among Workers Exposed to Plutonium on the Job at Rocky Flats;" "Risk from Plutonium in the Environment at Rocky Flats;" From Closing the Circle on the Splitting of the Atom (Washington, DC: U.S. Department of energy, January, 1995) page 38: "The Evolution of Health Protection Standards for Nuclear Workers;" from the Health Physics The Radiation Safety Journal, "Public Involvement in Science and Decision Making?" Submitted by Steve Tarlton; and from the RAC report No. 5-CDPHE-RFP-1998-FINAL(Rev.2)(2000): Assessing Risks of Exposure to Plutonium, "Organ doses from one day of exposure to an air concentration of 1 Bq/m3"

Date:

February 8, 2002

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RFCA Stakeholder Focus Group Attachment C

Title:

Meeting Minutes for August 22 and September 5,

2001 Meetings

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February 13, 2002

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RFCA Stakeholder Focus Group Attachment D

Title:

RSALs Working Group Meeting Notes for

February 7, 2002

Date:

February 8, 2002

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